

ENERGY RESOURCES CONSERVATION BOARD
Calgary Alberta

DECISION ON THE APPLICATION BY
CONSOLIDATED OIL AND GAS (CANADA) LTD.
FOR A LICENCE TO DRILL A WELL IN
THE GHOST PINE AREA

3/6 Decision 77-18
Application No. 770395

1 INTRODUCTION

1.1 The Application and Intervention

Consolidated Oil and Gas (Canada) Ltd. applied pursuant to the provisions of The Oil and Gas Conservation Act for a licence to drill a well in the Ghost Pine Area in Legal Subdivision 6 of Section 26, Township 29, Range 22, west of the 4th Meridian. The applicant proposes to drill and complete the subject well to evaluate and obtain production from all formations down to and including the Leduc Formation.

Bonerva Farms Ltd. filed an intervention opposing the application.

A map showing the proposed location and immediately surrounding lands is attached as Figure 1.

1.2 The Hearing

A public hearing of the application commenced before the Energy Resources Conservation Board (Board) on 14 June 1977 in Calgary, Alberta, with D. R. Craig, P.Eng., G. J. DeSorcy, P.Eng., and A. F. Manyluk, P.Eng., sitting. At the request of Bonerva Farms Ltd., the Board adjourned the hearing to 12 July 1977 at which time the hearing was completed.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives
(Abbreviation used in Report)

Witness

Consolidated Oil and Gas (Canada)
Ltd. (Consolidated)

B. V. Reed

G. D. Pauling, P.Geol.
E. D. McKellar

Bonerva Farms Ltd.

B. K. O'Ferrall

G. E. Snell

Energy Resources Conservation
Board Staff

A. L. McLarty
R. W. Edgecombe, P.Eng.
F. G. Sorenson

2 JURISDICTION OF THE BOARD

During the course of the hearing, counsel for Bonerva Farms urged the Board to refuse the subject well licence application, to protect Bonerva Farms from the impact on farming operations that would result if a well licence were granted and the subject well drilled as proposed. Counsel for the applicant urged the Board to disregard the matter of surface impact resulting from the well since this was beyond the Board's jurisdiction. He contended the matter is within the jurisdiction of the Surface Rights Board, pursuant to the provisions of The Surface Rights Act. It was thus urged on behalf of the applicant that, as its application was straightforward, which the Board takes to mean in compliance with the Act and regulations, the well licence should be granted without further inquiry.

On account of the foregoing, the Board believes it should set out its views on the Board's statutory authority respecting consideration of applications for and the granting

of well licences. Specifically, whether the Board may exercise any discretion in the issuance or refusal to issue a well licence, and if so, the nature and scope of that discretion, merit comment. The Board appreciates that the final interpretation of the statute and regulations on this matter must lie with the Courts.

In considering the relevant legislation and particularly section 26, subsection (1) of The Oil and Gas Conservation Act, the Board notes that it has the authority to grant, to grant subject to conditions, or to refuse a well licence. Where a licence is refused, the Lieutenant Governor in Council may review the application and direct the Board to issue the licence. On the basis of these provisions, the Board is satisfied that it has authority to exercise some discretion in the consideration of and granting of well licences. Assuming then that a mineral owner does have a right to enter and work his minerals, the Board is satisfied that the existing legislative and regulatory provisions restrict this right to something less than an absolute right.

With respect to the nature and scope of the discretion granted to it, the Board is of the view that a well location, both surface and subsurface, is a matter relevant to each well licence application, particularly as the specific purposes set out in The Oil and Gas Conservation Act include "to secure the observance of safe and efficient practices in the locating, spacing, drilling and equipping" of wells, and "to control pollution above, at or below the surface in the drilling of wells and in operations for the production of oil, gas and crude bitumen". From this the Board is satisfied that it has such jurisdiction as may be necessary to allow it to consider and weigh matters bearing on safe and efficient practices and the control of pollution in considering a well licence application. The Board believes the nature and magnitude of the likely effect of a well on surface lands, and operations carried out thereon to be relevant to the securing of safe and efficient practices and the control of pollution in the locating of a well.

The Board believes that its authority under the Act is limited substantially to an evaluation of the necessity and propriety of granting a well licence for a specific location. In making the evaluation the Board believes it appropriate to consider broad matters that could affect safety, efficient operations or control of pollution. It recognizes, however, that it does not have authority to

consider actual compensation since this is a matter for the Surface Rights Board in the event that the Board issues the well licence and the parties are not able to reach agreement.

The Board, accordingly, intends to evaluate Consolidated's well licence application and the specific well location requested having regard to, amongst other matters, the impact on the surface likely to result from the well.

3 THE ISSUES

The Board considers the principal issues of the application to be:

- (a) the need for a well which would penetrate the potential hydrocarbon bearing strata beneath the west half of Section 26; and
- (b) if the need referred to in item (a) is established, the specific surface location of the well.

4 THE NEED FOR A WELL WHICH WOULD PENETRATE THE POTENTIAL HYDROCARBON BEARING STRATA BENEATH THE WEST HALF OF SECTION 26

4.1 Consolidated's Views

Consolidated stated that it has leased the petroleum and natural gas rights in the west half of Section 26 from Mr. E. D. McKellar and that the lessor and lessee were both anxious to explore for and develop the hydrocarbon reserves that may be present. Consolidated pointed out that the west half of Section 26 has not been proven productive to date and contended that it would be necessary for a well to penetrate the potentially productive zones in order to prove whether commercial reserves are present. Consolidated added that its geological studies and the knowledge that capable oil and gas wells presently exist in the general area indicate there are encouraging formations and suggest that a well drilled in LS 6-26 might be productive of either or both oil and gas from as many as nine different zones.

Consolidated stated that it did not seriously consider alternative locations to LS 6-26 because it believed that location to be optimum and because it did not control the

rights to other lands in the area. The mineral rights to the east half of Section 26 are controlled by the participants in the Ghost Pine Unit who refused to participate in a well planned for Section 26 about a year ago. The Unit was not asked to participate in the subject well because Consolidated now preferred to drill and evaluate its lease so it could compete in June 1977 Crown land sales without partners. Consolidated contended that because the well licence for LS 6-26 had been delayed pending the outcome of the subject proceedings, it was unable to evaluate its land in time to properly prepare a bid for the sales.

4.2 Bonerva Farms' Views

Bonerva Farms stated that it was not taking the position that the well should not be drilled and agreed that the applicant has the right to explore for and produce the oil and gas reserves that may be present under the west half of Section 26. It contended, however, that such a right was not without qualification and that the well licence should be refused if the surface would be unreasonably interfered with. Mr. G. Snell, witness for Bonerva Farms, stated that while he preferred that a well not be drilled in Section 26, it appeared that according to the law he had no choice. Mr. Snell added that realizing his responsibility as a surface owner to the people of Alberta, the oil company, and himself as a user of energy, he must permit the well to be drilled but not necessarily at the proposed LS 6-26 location.

4.3 Board's Views

There are a number of matters which affect the Board's views respecting the need for a well which would penetrate the potentially productive formations beneath the west half of Section 26. First and foremost is the geology of the region and the need for such a well in order to have a successful oil or gas well. A closely related matter is that of conservation and the question of whether any oil or gas which might underlie the west half of Section 26 could be recovered without a well actually penetrating the source formations beneath the lands. A further consideration, which needs to be addressed only if it is concluded that a successful well could be completed and the reserves recovered without penetrating the formations beneath the west half of Section 26, is whether the business arrangements which would be necessary with off-setting mineral owners could be reasonably completed.

The Board notes that the regional geology and extent of the oil and gas reserves already established in the area are not well known and that the applied-for well would therefore be considered exploratory. The Board further notes that the applicant is reasonably confident that a successful well could be drilled in LS 6-26 and stated that it would not consider moving the subsurface location because of the increased risk of drilling a dry hole. The Board believes, as a matter of principle, that it should not superimpose its judgement over that of an operator as to the location of an exploratory well unless it is convinced that an equally attractive alternative subsurface location exists. Such is not the case in this instance.

With respect to conservation, it is possible that a small accumulation of oil or gas directly underlies the subject lands. If a well which would penetrate the potentially productive strata beneath the west half of Section 26 is not drilled, such reserves might not be discovered and recovered. Moreover, it is also possible that if there are reserves under the west half of Section 26 that extend beyond the half section, they may not be recovered efficiently by wells with subsurface locations outside the lands in question.

Notwithstanding the claimed optimal location of the proposed well and the possibility there may be poor conservation if such a well is not drilled, the Board has considered other alternatives which might provide the opportunity to explore for and develop the minerals without drilling a well having a subsurface location beneath the west half of Section 26. The Board notes that there are occasions when it is undesirable or impossible for a mineral owner to locate a well in the drilling spacing unit to which it has the rights. Most often, in cases where the adjacent land is of common ownership or where a voluntary pooling agreement can be reached with the adjacent owners, a special enlarged drilling spacing unit is established on approval from the Board. The enlarged spacing units are normally associated with a new target area so that there would not be an off-target penalty restriction on the production taken from a well. Such an approach in this case would require either a voluntary or compulsory pooling arrangement with adjacent owners because the applicant controls the minerals to only the west half of Section 26. In the Board's view, the applicant would have little basis on which to initiate such a business agreement since it has no evidence that its land is in fact

productive. There would be no evidence that the applicant should be entitled to share in the production taken from a well that does not penetrate the productive formations beneath its land. In addition, the Board recognizes that the applicant believes that the best well location in the general area is within LS 6-26 and that it would therefore be reluctant to pool with offset owners and share the production should a well drilled elsewhere be successful.

Based on the foregoing considerations, the Board concludes that there is a need for a well which would penetrate the potentially productive strata beneath the west half of Section 26.

5 THE SPECIFIC SURFACE LOCATION OF THE WELL

5.1 Consolidated's Views

Consolidated stated that it used the conventional tools of exploration such as seismic data and logs, samples and cores, from nearby wells to evaluate its property and select what it believed to be the optimum location. Consolidated said it believed the proposed well was potentially productive from a number of zones above the Leduc Formation but added that the applied-for site in the northeast corner of LS 6-26 was selected primarily because its geophysical information indicated it to be the best location from which to evaluate the Leduc Formation.

Consolidated stated that it had considered alternative locations within the west half of Section 26 but added that all were unsatisfactory either because of geological or target area constraints. Responding to questions, Consolidated said it believed it would have some flexibility of location within LS 6-26 and indicated that the well could be moved some 175 feet without increasing the risk of drilling a dry hole. Consolidated stated that it was not prepared to directionally drill the proposed well from a surface location which would satisfy Bonerva Farms. It contended that a directional hole introduces several technical difficulties and that the drilling, completion and operating costs would be increased by two or three times that of a vertical well drilled to the same depth.

Consolidated stated that it was fully aware of the inconvenience and loss of agricultural production that would

result if a successful well is drilled in LS 6-26. It contended that a location change within the target area on the west half of Section 26 would not significantly reduce the effect of the well on the farming operation and added that it was prepared to pay compensation for the inconvenience and losses suffered by Bonerva Farms. Consolidated reiterated that such compensation was not a matter for the Energy Resources Conservation Board and should either be negotiated with Bonerva Farms or arbitrated by the Surface Rights Board. Consolidated advised the Board at the hearing that it was prepared to construct a low profile access road to the well with broad backslopes and indicated it would consider installing a low wellhead, a buried power line, and any other reasonable request by Bonerva Farms that would serve to minimize the effect of the well on the farming operation.

5.2 Bonerva Farms' Views

Bonerva Farms contended that the applicant had presented little or no geological or geophysical evidence supporting its contention that the well must be drilled in LS 6-26 for it to be successful. Bonerva Farms added that while it was not seeking specific geological information, the applicant should be required to detail the flexibility it has in selecting an optimum location and perhaps provide the Board or the Board's staff with its geological evidence. Stating that it was not satisfied with the applicant's reasons for having to drill in the northeast corner of LS 6-26, Bonerva Farms suggested that, should the geology not be a restricting factor, the target area and correlative rights constraints might be resolved. This would allow the applicant to drill an equally good well at a surface location which would cause less interference to farming operations. Bonerva Farms pointed out that it was not opposing the drilling of any well, but rather was suggesting that a well location in the southeast corner of LS 3-26 or alternatively in LS 14-26 would be better than the proposed location because of the reduced effect on the farming operations.

Mr. G. Snell, witness for Bonerva Farms, said he believed that the proposed well would result in approximately 13 acres of his number one land being taken out of production. He stated that the land was valued at \$600 an acre and estimated its food production capability to average 30 bushels of wheat per acre per year. Mr. Snell stated that the land has yielded between 55 and 60 bushels of wheat per

acre in a dry year but added that the average yield is lower because the land is sometimes summer fallowed.

Mr. Snell estimated that having to farm around the well would increase the length of time required to complete each operation by 20 per cent and thus reduce his farming efficiency by that amount. He added that farming around any obstacle in a field resulted in triangular-shaped fields being formed. Triangular-shaped fields are considered by Mr. Snell to be very inefficient primarily because of the increased number of turns made by each implement, particularly where large equipment such as his was being used. As a result, each operation takes longer to complete and average yields are decreased because of such factors as soil compaction and double seeding. Based on the assumption that a well was drilled and completed in LS 6-26, Mr. Snell agreed that his farming efficiency could be maintained by dividing the field into rectangular shaped fields and purchasing smaller equipment to farm the smaller ones. He added, however, that it would not be logical or economically feasible to purchase and operate the smaller equipment required for this one special problem area.

Mr. Snell stated that Section 26 was presently free of obstacles except for farm buildings in the southeast corner of LS 3-26. Mr. Snell added that while he is presently farming the east half and west half as separate fields, he has plans to remove the buildings and to farm the entire section as one field when larger equipment than he is presently using is available. Mr. Snell also stated he is researching the possibility of irrigating the entire section but added that his plans are now dependent on the Board's decision respecting the subject application for a well licence.

Mr. Snell broadly estimated that the proposed well would cost Bonerva Farms approximately \$100 000 because of reduced land values, long-term decreased agricultural productivity and increased operating costs. He agreed that efforts by Consolidated such as backsloping the access road would help his operation but concluded that the only way to minimize the effect of the well would be to drill it close to the section boundary in either LS 3-26 or LS 14-26 thus minimizing the length of the access road.

5.3 Board's Views

Having concluded that it is necessary to have a well penetrate the potentially productive strata beneath the west half of Section 26, the Board considered the question of the specific location from which the well could be drilled. In the Board's view there are several situations where it might either deny a well licence application or grant it subject to relocation at the surface or to certain safety-oriented conditions. These situations are discussed separately in the order listed below.

- (a) Where there is serious hazard to people.
- (b) Where the impact on the natural environment is unacceptable.
- (c) Where an equally acceptable alternative is available which would significantly reduce the impact on the surface.
- (d) Where the economic impact on the surface would be greater than the economic benefits that could be derived from the subsurface resources.

5.3.1 Where There is Serious Hazard to People

The Board recognizes that the hazard to people is not an issue in this case and consequently would not be a reason for refusing the application. At the same time, the Board believes that its policies respecting such a situation are worthy of note. The Board's regulations governing the locating of wells do not normally permit wells to be drilled within 330 feet of surface improvements such as roads, residences and schools. Additionally, applications for a licence to drill a well which could be expected to penetrate a zone containing hydrogen sulphide gas are carefully considered to determine what effect the well might have on public safety. Wells which could be expected to produce hydrogen sulphide gas are normally not permitted near the boundaries of a town or city, or indeed, close enough to residences to potentially result in a hazardous concentration of sour gas at the residence. In certain cases, where the potential hazard is not considered serious, the Board has permitted a well to be drilled but subject to special safety conditions, which, in the Board's opinion, reduce the potential hazard to an acceptable level. An example of where the Board dealt with an application for a sour gas well is given in Decision 77-4.

5.3.2 Where the Impact on the Natural Environment is Unacceptable

In regard to this situation, the Board notes that certain sections of its regulations were designed specifically to protect the natural environment. For example, wells are not normally permitted within 300 feet of a body of water or permanent stream. In addition, where the Board is convinced that a well would, for instance, threaten the existence of rare birds or create land erosional hazards, it could refuse to permit a well or condition the licence such that the effect of the well would be reduced to an acceptable level. This situation, however, is not an issue which would affect the Board's decision on the subject application.

5.3.3 Where an Equally Acceptable Alternative is Available Which Would Significantly Reduce the Impact on the Surface

The Board believes that this situation is relevant to the subject application and has considered whether the applicant could drill a well with a subsurface location in the west half of Section 26 from a surface location other than the applied-for site in the northeast corner of LS 6-26. The Board notes that little would be gained by modestly moving the location within LS 6-26 and consequently has concentrated its attention on the possibilities of drilling from outside the half section or from LS 3 or 14.

Recognizing that the applicant said it believes its proposed well is potentially productive of both oil and gas, the Board notes that the only common subsurface target area is within LS 6-26. A vertical hole drilled from LS 3-26 would be off-target for both oil and gas and a vertical hole drilled from LS 14-26 would be off-target for gas. The correlative rights problem with adjacent mineral owners would thus make it difficult to come to an agreement with them for a well on either of these locations. However, the Board agrees with Bonerva Farms that unless there are also geological constraints which would preclude drilling at these alternative locations, the correlative rights problem should not, by itself, preclude an off-target location. Unfortunately in this case, there are geological constraints based on the applicant's contention that it has selected the optimum location for its well and that any significant move of its subsurface co-ordinates would increase the risk of drilling a dry hole. It is the Board's view that inter-

vention by a regulatory agency in the choice of location of an exploratory well would hamper exploration. As noted in Section 4.3 of this report, the Board does not believe it should superimpose its judgement over that of an operator, particularly where the geological and geophysical information used to determine an optimum location for an exploratory well is highly interpretative rather than factual. Accordingly, the Board would not be prepared to deny the application for the subject well licence on the grounds that a vertical well could be drilled from either of LS 3 or 14 of Section 26. The Board does, however, wish to observe that in this particular case, since the data used by the applicant to select its location was obtained from seismic surveys and wells drilled outside of Section 26, the applicant may have attributed more precision to its subsurface interpretation than the data warranted. This would suggest that a modest move of the well location, possibly of a few hundred feet, might be possible.

The Board has considered the merits of a well directionally drilled from a surface location along the periphery of Section 26 or from outside of the section. The advantage of such a well would be a shorter access road and thus some reduction in the interference with surface operations. Based on the information available to it, the Board expects that the cost of drilling a 6000-foot vertical well in this area would be approximately \$125 000. A directional well drilled from LS 3-26, a deviation of nearly one-half a mile, would cost nearly double or approximately \$250 000 and a directional well drilled from off the section would be even more expensive. Completion and production costs for a directional well would also be greater than for a vertical well. In addition, the Board agrees with the applicant that a directionally drilled well would introduce several technical difficulties. In fact, drilling a directional well from the southeast corner of LS 3-26 to the northeast corner of LS 6-26 which would penetrate all of the potentially productive zones within the target area (LS 6) would be extremely risky and perhaps impossible. Having regard for the increased cost of at least \$125 000 for a directionally drilled well and for the estimate by Mr. Snell that the total impact of the proposed well on Section 26 would be \$100 000, an estimate the Board believes is high, it is concluded that this alternative is not practical in terms of economics.

5.3.4 Where the Economic Impact on the Surface would be Greater than the Economic Benefits that Could be Derived from the Subsurface Resources

The Board realizes that the interest of the petroleum industry often conflict with those of the agricultural industry but notes that in the majority of such cases the interests of both industries are satisfied by mutual agreement and compensation. However, in cases such as the one at hand, the Board believes it must consider the impact on the surface and weigh this impact against the benefits that might accrue to the province as a result of drilling a successful well.

The Board notes that Bonerva Farms said it believed the proposed well would reduce its farming efficiency by 20 per cent and, as a result of decreased land values, reduced food production and increased operating costs, its operation would stand to lose approximately \$100 000 over the life of the well. The Board questions the magnitude of the estimated impact on efficiency and notes that a 20 per cent overall reduction in efficiency would be the equivalent of taking 128 acres of the total section out of production even though the well site and access road involve only some 13 acres. The Board agrees that there would be inefficiencies beyond the land directly lost to production but believes that these would total less than the equivalent of 115 acres (128 minus 13) of lost production.

The Board believes that one method by which the economic impact on the surface can be balanced against potential economic benefits from the subsurface resources is to compare the gross value of the crops that could be grown to the oil or gas which might be produced. The Board recognizes that comparing gross values disregards the costs of production but believes that such an approach measures the value which society places on the "products" which could be obtained through the alternative uses of the land and considers that this is a more appropriate measure than one which would reflect other economic impacts such as profits or revenue to governments. Even though the Board has mentioned previously that it believes the 20 per cent loss in efficiency to be overstated, it has used this estimate in its calculations. The Board notes that Bonerva Farms said

it believes that Section 26 was presently capable of producing an average of 30 bushels of wheat per acre per year. Assuming a 20 per cent loss in efficiency and a price of \$3 per bushel, the total cash value of the lost wheat production would be \$11 520 in an average year (640 acres X 30 bushels per acre X \$3 per bushel X 0.2 efficiency loss = \$11 520). Noting that Bonerva Farms said it was investigating the possibility of irrigating the entire section and that the average yield per acre could double, the Board estimates that, assuming that a well would not preclude irrigation, the total value of the lost wheat crop in an average year would be approximately \$23 000.

The Board notes that the proposed well may be found unproductive and would therefore be abandoned. If so, the impact on Bonerva Farms would be transitory; damages and lost production during the maximum period of one growing season would be compensated for and no continuing problem would exist. It is only if a successful well is completed that the agricultural losses referred to in the previous paragraph would occur. In assessing the gross value of oil production which might be encountered, the Board notes that Leduc Formation oil wells in the nearby West Drumheller Field are producing in excess of 2000 barrels of oil per month. Assuming a much lower rate of 500 barrels per month, which is near the lower end of the range of producing wells in the province, and an oil price of \$10 per barrel, the total cash value of the oil produced in one year would be \$60 000 (500 barrels per month X 12 months X \$10 per barrel = \$60 000). The cash value of the oil assuming a rate of production similar to wells in the West Drumheller Field would be four times that amount or \$240 000. To assess the economics of a successful gas well, the Board assumed a modest flow rate of 1.0 million cubic feet of gas per day and a gas price of \$1.25 per thousand cubic feet. For a one-year period, the total value of gas produced would be approximately \$450 000 (1.0 million cubic feet per day X \$1.25 per 1000 cubic feet X 365 days per year = \$450 000).

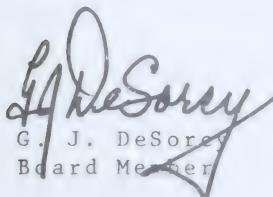
Comparing the gross value of oil or gas production which may occur if a successful well is completed to the maximum gross value of agricultural losses which could occur, the Board concludes that the overall effects on the farming operations of the proposed well are not so great as to justify refusal of the well licence.

6 DECISION

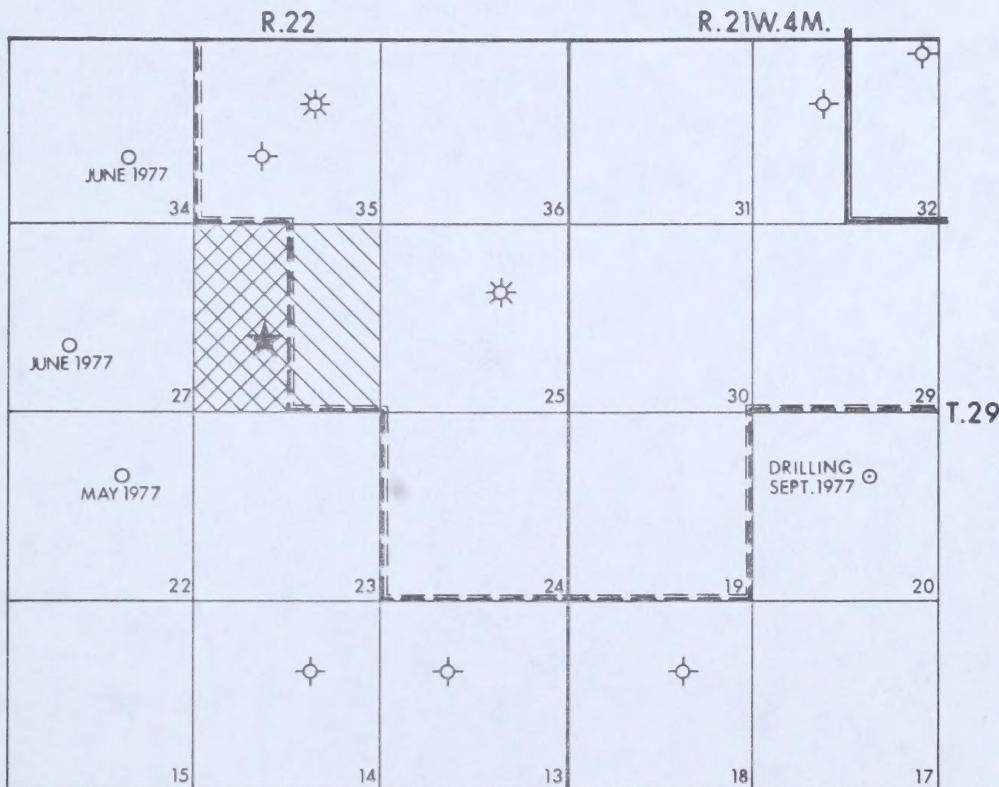
The Board grants the application of Consolidated Oil and Gas (Canada) Ltd. to drill the proposed well, COGCAN GPINE 6-26-29-22, for the purpose of evaluating and obtaining production from each formation down to and including the Leduc Formation. The Board will issue the well licence in due course. The Board assumes that the operator will, consistent with statements made at the hearing, consider appropriate actions which would minimize the impact of the well on agricultural operations. These might include a broad backsloped access road, an underground power supply, a low profile wellhead and a modest relocation of the well within LS 6-26.

DATED at Calgary, Alberta on 17 October, 1977.

ENERGY RESOURCES CONSERVATION BOARD



G. J. DeSorey
Board Member



- ★ PROPOSED WELL LOCATION
- ☀ GAS WELL
- ABANDONED
- POTENTIAL GAS WELL
-Completed subsequent to
Consolidated's application

- ▨ CONSOLIDATED-MINERAL OWNERSHIP
- ▨ BONERVA FARMS-SURFACE OWNERSHIP
- ▨ WEST DRUMHELLER FIELD
- ▨ GHOST PINE UNIT

FIGURE 1 PROPOSED WELL AND SURROUNDING AREA

